What is claimed is:

1. An overlay mark for determining the relative shift between two or more successive layers of a substrate, the overlay mark comprising:

at least one test pattern for determining the relative shift between a first and a second layer of the substrate in a first direction, the test pattern having a first set of working zones and a second set of working zones, the first set being disposed on a first layer of the substrate and having at least two working zones diagonally opposed and spatially offset relative to one another, the second set being disposed on a second layer of the substrate and having at least two working zones diagonally opposed and spatially offset relative to one another.

2. The overlay mark as recited in claim 1 wherein the image of the test pattern is captured via an imaging tool and an analysis algorithm is used to calculate the relative displacement of the working zones from the captured images.

3. The overlay mark as recited in claim 1 wherein the first set of working zones is angled relative to the second set of working zones.

4. The overlay mark as recited in claim 1 wherein the working zones are positioned within the perimeter of the mark.

5. The overlay mark as recited in claim 4 wherein the perimeter of the mark corresponds to the optical perimeter of the field of view of the metrology tool used to image the overlay mark, the field of view defining the area available for capturing an image via the metrology tool.

6. The overlay mark as recited in claim 5 wherein the working zones substantially fill the perimeter of the mark.

7. The overlay mark as recited in claim 1 wherein the working zones are spatially separated from one another so that they do not overlap portions of an adjacent working zone.

8. The overlay mark as recited in claim 1 wherein the working zones are configured to diminish the impact of non-uniformities across the mark on tool and wafer induced shifts.

9. The overlay mark as recited in claim 1 further including a periodic structure positioned within each of the working zones, each of the periodic structures including a plurality of coarsely segmented elements.

10. The overlay mark as recited in claim 9 wherein the pitch, period and duty cycle of the coarsely segmented elements is configured to balance the resolution of the metrology used to image the overlay mark and the robustness of the process used to form the layers.

11. The overlay mark as recited in claim 9 wherein the coarsely segmented elements are parallel lines.

12. The overlay mark as recited in claim 9 wherein the relative shift between the first and second layers of the wafer is determined by comparing the relative positions of periodic structures on different layers.

13. The overlay mark as recited in claim 9 wherein the plurality of coarsely segmented elements are formed by a plurality of finely segmented elements.

14. The overlay mark as recited in claim 13 wherein finely segmented elements are configured to provide shift information that more closely matches the relative shift between patterns of an integrated circuit formed on each of the two layers of the substrate.

15. The overlay mark as recited in claim 1 further comprising a second test pattern for determining the relative shift between a first and a second layer of the substrate in a second direction.

16. The overlay mark as recited in claim 15 wherein the second test pattern is orthogonal to the first test pattern.

17. The overlay mark as recited in claim 16 wherein the first direction corresponds to the X-direction and the second direction corresponds to the Y-direction.

18. The overlay mark as recited in claim 15 further comprising a third test pattern and a fourth test pattern for determining the relative shift between a first and a second layer of the substrate in the first and second directions, respectively.

19. The overlay mark as recited in claim 1 wherein the first layer is disposed directly above or below the second layer.

20. An overlay mark for determining the relative shift between two or more successive layers of a substrate via an imaging device configured for capturing an image of the overlay mark, the overlay mark comprising:

a first set of working zones disposed on a first layer of the substrate and having at least two working zones diagonally opposed to one another and positioned within the perimeter of the mark, each of the working zones having a periodic structure of coarsely segmented elements positioned therein, the coarsely segmented elements being oriented in a first direction; and

a second set of working zones positioned crosswise relative to the first working group, the second working group being disposed on a second layer of the substrate and having at least two working zones diagonally opposed to one another and positioned within the perimeter of the mark, each of the working zones having a periodic structure of coarsely segmented elements positioned therein, the coarsely segmented elements being oriented in the first direction.

21. The overlay mark as recited in claim 20 wherein the perimeter of the mark corresponds to the optical perimeter of the field of view of the imaging device used to image the overlay mark, the field of view defining the area available for capturing the image of the overlay mark.

22. The overlay mark as recited in claim 21 wherein the working zones substantially fill the perimeter of the mark.

23. The overlay mark as recited in claim 20 wherein the working zones are spatially separated from one another so that they do not overlap portions of an adjacent working zone.

24. The overlay mark as recited in claim 20 wherein the working zones are configured to diminish the impact of non-uniformities across the mark on tool and wafer induced shifts.

25. The overlay mark as recited in claim 20 wherein the pitch, period and duty cycle of the coarsely segmented elements is configured to balance the resolution of the metrology used to image the overlay mark and the robustness of the process used to form the layers.

26. The overlay mark as recited in claim 20 wherein the coarsely segmented elements are parallel lines.

27. The overlay mark as recited in claim 20 wherein the relative shift between the first and second layers of the wafer is determined by comparing the relative positions of periodic structures on different layers.

28. The overlay mark as recited in claim 20 wherein the plurality of coarsely segmented elements are formed by a plurality of finely segmented elements.

29. The overlay mark as recited in claim 28 wherein finely segmented elements are configured to provide shift information that more closely matches the relative shift between patterns of an integrated circuit formed on each of the two layers of the substrate.

30. An overlay mark for determining the relative shift between two or more separately generated patterns on a single layer of a substrate, the overlay target comprising:

a test region positioned on a first layer of the substrate, the first layer being formed by a first pattern via a first process and a second pattern via a second process;

a plurality of working zones positioned in the test region, the working zones representing the actual areas of the test region that are used to determine the relative shift between the first and second patterns, wherein a first portion of the working zones are formed via the first process and a second portion of the working zones are formed via the second process;

a periodic structure positioned within each of the working zones, each of the periodic structures including a plurality of coarsely segmented elements, each of the coarsely segmented elements being formed by a plurality of finely segmented elements.

31. A method for determining the relative shift between two or more successive layers of a substrate or between two or more separately generated patterns on a single layer of a substrate, the method comprising:

capturing an image of an overlay mark formed on the substrate, the overlay mark having a plurality of working zones, each of the working zones including a periodic structure of coarsely segmented elements;

selecting a plurality of working zones from the captured image, wherein at least one working zone from each layer or pattern is selected;

forming representative signals for each of the selected working zones, wherein at least one signal for each layer or pattern is formed; and

comparing the signal from a first layer or pattern to a signal from a second layer or pattern to determine the relative shift between different layers or patterns.

32. The method as recited in claim 31 wherein forming representative signals is accomplished by collapsing the 2D images of the working zones into 1D signals by averaging over X for Y-overlay calculations and by averaging over Y for X-overlay calculations.

33. The method as recited in claim 31 wherein comparing the signal from a first layer or pattern to a signal from a second layer or pattern to determine the relative shift between different layers or patterns is accomplished via a covariance-based overlay algorithm.

34. The method as recited in claim 31 wherein comparing the signal from a first layer or pattern to a signal from a second layer or pattern to determine the relative shift between different layers or patterns is accomplished via a Fourier Decomposition overlay algorithm.

35. The method as recited in claim 31 wherein the coarsely segmented elements are formed by a plurality of finely segmented elements.